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09/835,535	04/16/2001	Mikhail E. Ghali	165104-600-001	5410

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EXAMINER	
BRANT, DMITRY	

ART UNIT	PAPER NUMBER
2655	10

DATE MAILED: 12/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/835,535	GHALI, MIKHAIL E.	
	Examiner	Art Unit	
	Dmitry Brant	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☒ Claim(s) *5-8,11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *9*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Drawings

1. Specification should not have embedded drawings. Only embedded tables are allowed. Drawings on pages 7 and 12 should be provided and numbered separately. Drawings should only be referenced in the specification. Appropriate correction is required.

Claim Objections

2. Claim 8 and 11 are objected to because of the following informalities:

Claim 8 recites "said transcription alphabet" and refers to claim 1, however, neither claim 8 or claim 1 recite "transcription alphabet". The examiner has interpreted "transcription alphabet" in claim 8 as the new limitation on claim 1.

Claim 11 refers to claim 2, however, it recites "said network" which is not available in claim 2. Claim 11 will be treated as if it referred to claim 10, which contains "extraction over a network".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-4, 12-15 and 19 are rejected 35 U.S.C. 103(a) as being obvious over Bordeaux (5,758,023), in view of Shu (6,016,470).

As per claim 1, Bordeaux discloses "retrieving from storage neural network parameters, weights and dictionaries for the appropriate language" (Col. 5, line 26-30). Inherently, neural network must know the phonological/phonetic units associated with the language and its variations, in order to properly identify phonemes and allophones (Col. 5, lines 38-41)

Bordeaux does not disclose "developing a maximal set based on said defined phonological units, phonetic units, and identified variations in said language, and reducing said maximal set to a minimal set of phonemes and allophones, thereby providing for a compact model for acoustically transcribing said language. "

Shu teaches a method of building a rejection grammar, which originally starts with a full set of phonemes of a given language and then gradually shrinks the set until sufficient accuracy is achieved using the smallest number of phoneme models. (Fig 5, Col. 8, lines 6- 10)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system disclosed by Bordeaux to follow up the process of training the neural network with a reduction process taught by Shu. This would significantly improve the efficiency of the system because duplicate and unnecessary phoneme entries would be removed

from the system, thus improving the speed of operation and reducing memory requirements for the neutral network.

As per claim 2, Bordeaux discloses "retrieving from storage neural network parameters, weights and dictionaries for the appropriate language" (Col. 5, line 26-30).

Bordeaux does not disclose "a step of extracting information that further comprises: identifying terminological problems associated with said language, identifying transcription problems associated with said language, extracting all phonological and phonetic units associated with said language, and selecting a representative symbol for the transcription alphabet "

At the time of the invention, it would have been obvious to a person of ordinary skill in the art that the "dictionaries for the appropriate language" could contain additional terminological and transcription information about the language, as well as full phonological/ phonetic alphabets for that language. This would allow to the system to keep all information pertinent to recognition of a specific language in a logically separate data unit, such as dictionary.

As per claim 3, Bordeaux does not disclose "maximal set [that] comprises any of, or a combination of: phonemes, allophones, rules governing the selection of allophones, a set of examples, and transliteration symbols".

Shu teaches a method of building a rejection grammar, which originally starts with a maximum (full) set of phonemes of a given language and then gradually shrinks the set until

sufficient accuracy is achieved using the smallest number of phoneme models. (Fig 5, Col. 8, lines 6- 10)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system disclosed by Bordeaux to train the neural network to initially contain a full set of phoneme models, as taught by Shu. This would allow the system to learn all the necessary phonemes for language recognition, even at the cost of some unnecessary phoneme duplication. These duplicate phonemes are removed in the "reduction" step that follows the creation of maximal set.

As per claim 4, Bordeaux discloses the training of the neutral network using examples for each of the desired phones for a specific language (Col. 10, lines 20-23).

Bordeaux does not disclose "a said step of reducing said maximal set further comprises reducing an automatic speech recognition phonetic set."

Shu teaches a method of building a rejection grammar, which originally starts with a full set of phonemes of a given language and then gradually shrinks the set until sufficient accuracy is achieved using the smallest number of phoneme models. (Fig 5, Col. 8, lines 6- 10)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system disclosed by Bordeaux to follow up the process of training the neural network with a reduction process taught by Shu. This would significantly improve the efficiency of the system because duplicate and unnecessary phoneme entries would be removed from the ASR set of the system, thus improving the speed of operation and reducing memory requirements for the neutral network.

As per claim 12, Bordeaux discloses Microphone (Col. 5, line 66), computer system (Col. 13, lines 34-36), and Medium Vision Pro Audio Spectrum card (Col. 13, lines 56-57). The computer system and accompanying software performs speech analysis and voice-to-text translation (Col.13, lines 57-60)

Bordeaux does not disclose using compact set of phonetic alphabets for voice-to-text system.

Shu teaches a method of constructing a smaller set of phoneme models. (Fig 5, Col. 8, lines 6- 10)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system disclosed by Bordeaux to follow up the process of training the neural network with a reduction process taught by Shu. This would significantly improve the efficiency of the system because duplicate and unnecessary phoneme entries would be removed from the system, thus improving the speed of operation and reducing memory requirements for the neutral network.

As per claim 13, Bordeaux discloses ASR (voice-to-text translation , Fig.1, input to element 3, output of element 7)

As per claim 14, Bordeaux discloses an ASR system that is speaker-independent (Col. 13, line 63).

As per claim 19, Bordeaux discloses a Microphone (Col. 5, line 66), computer system (Col. 13, lines 34-36), and Medium Vision Pro Audio Spectrum card (Col. 13, lines 56-57). The computer system stores language dictionaries (9, FIG. 1) and accompanying software performs speech analysis and voice-to-text translation (Col.13, lines 57-60).

Bordeaux does not disclose using compact set of phonetic alphabets for voice-to-text system.

Shu teaches a method of constructing a smaller set of phoneme models. (Fig 5, Col. 8, lines 6- 10)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system disclosed by Bordeaux to follow up the process of training the neural network with a reduction process taught by Shu. This would significantly improve the efficiency of the system because duplicate and unnecessary phoneme entries would be removed from the system, thus improving the speed of operation and reducing memory requirements for the neutral network.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being obvious over Bordeaux and Shu, as applied to claim 4, an further in view of Selounai ("Recognition of Arabic Phonetic Features Using Neural Networks and Knowledge-Based System: a Comparative Study")

Bordeaux discloses a phone identifier (5, FIG. 1) that is trained to recognize phonemes and all legitimate speech sounds in a language including such sounds as murmurs, and allophones. (Col. 8, lines 8-15)

Bordeaux and Sho do not disclose that the step of reducing an automatic speech recognition set further comprises the use of diacritics, graphemes, and allophones.

Selounai teaches the use of diacritics and graphemes as part of the Arabic phonetic alphabet (page 408, right column, lines 50-55)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the reduction of language set disclosed by Bordeaux and Shu to include diacritics and graphemes because this would allow Bordeaux's system to handle standard Arabic utterances for speech-to-text translation in order to improve linguistic capabilities of the system.

6. Claim 15 is rejected 35 U.S.C. 103(a) as being obvious over Bordeaux in view of Shu, as applied to claim 14 and further in view of Neti et al. (5,953,701).

Bordeaux and Shu do not disclose a system that is speaker dependant on gender or age.

However, Neti et al. teaches gender-dependant speech recognition (Abstract)

Therefore, it would have been obvious to a person of ordinary skill in the art to modify system disclosed by Bordeaux to use gender-dependant speech recognition, as taught by Neti, because it would enable it to perform better in contexts where speech recognition of specific gender was desirable.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being obvious over Bordeaux and Shu as applied to claim 1, and further in view of Buth et al. (6,546,369).

Bordeaux does not disclose the use of International Phonetics Alphabet (IPA) for transcribing the language.

Bueth et al. teaches the use of IPA to transcribe the language (Col. 1, lines 63-65).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the system disclosed by Bordeaux to use IPA for transcribing. This would enable Bordeaux's system to transcribe using internationally accepted standard, hence making the system portable to a multitude of languages.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being obvious over Bordeaux and Shu, as applied to claim 1, an further in view of Selounai.

Bordeaux discloses that his system supports a multitude of pre-determined languages using a neural network (Col.5, lines 20-27).

Bordeaux does not disclose that one of these languages is modern Arabic, classical Arabic or colloquial Arabic.

Selounai teaches the use of neural networks for automatic recognition of Arabic language (Abstract)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art that the neural networks in the system disclosed by Bordeaux could use an approach taught by Selounai. This modification of Bordeaux's system would allow it to support Arabic among other pre-determined languages in order to increase linguistic capability of the system.

9. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being obvious over Bordeaux and Shu, as applied to claim 1, and further in view of Jeppesen (6,490,557).

As per claim 10, Bordeaux discloses the use of computer the ASR system (Col. 13, lines 30-60).

Bordeaux and Shu do not disclose downloading phonetic information over a network.

Jeppesen teaches the use of Internet with a central ASR system (23, FIG. 3).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to centralize the ASR system to use Internet as taught by Jeppesen, because it would allow the move the storage of phonetic information to a server and hence reduce the amount of information stored on the client computer. In addition, it would simplify the update of phoneme information to the ASR computers in the networked environment.

As per claim 11, Bordeaux and Shu do not teach downloading phonetic information over WAN, LAN, Internet and HTTP-based networks.

However, it would have been obvious to a person of ordinary skill in the art that use of Internet inherently embodies the use of WAN, LAN, wireless and other types of networks.

10. Claims 16, 18 are rejected under 35 U.S.C. 103(a) as being obvious over Bordeaux and Shu, as applied to claim 12, and further in view of Selounai.

As per claim 16, Bordeaux discloses a phone identifier (5, FIG. 1) that is trained to recognize phonemes and all legitimate speech sounds in a language including such sounds as murmurs, and allophones. (Col. 8, lines 8-15)

Bordeaux and Shu do not disclose the use of diacritics and graphemes in the phonetic alphabet.

Selounai teaches the use of diacritics and graphemes as part of the Arabic phonetic alphabet (page 408, right column, lines 50-55)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the language set disclosed by Bordeaux to include diacritics and graphemes because this would allow Bordeaux's system to handle standard Arabic utterances for speech-to-text translation in order to improve linguistic capabilities of the system.

As per claim 18, Bordeaux discloses that his system supports a multitude of pre-determined languages using a neural network (Col.5, lines 20-27).

Bordeaux and Shu do not disclose that one of these languages is modern Arabic, classical Arabic or colloquial Arabic.

Selounai teaches the use of neural networks for automatic recognition of Arabic language (Abstract)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art that the neural networks in the system disclosed by Bordeaux could use an approach taught by Selounai. This modification of Bordeaux's system would allow it to support Arabic among other pre-determined languages.

11. Claim 17 is rejected under 35 U.S.C. 103(a) as being obvious over Bordeaux and Shu as applied to claim 12, and further in view of Buth et al.

Bordeaux and Shu do not disclose the use of International Phonetics Alphabet (IPA) for transcribing the language.

Bueth et al. teaches the use of IPA to transcribe the language (Col. 1, lines 63-65).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the ASR system disclosed by Bordeaux to use IPA for transcribing. This would enable Bordeaux's system to transcribe using internationally accepted standard, hence making the system portable to a multitude of languages.

12. Claim 20 is rejected under 35 U.S.C. 103(a) as being obvious over Bordeaux and Shu, as applied to claim 19, and further in view of Selounai.

Bordeaux discloses a phone identifier (5, FIG. 1) that is trained to recognize phonemes and all legitimate speech sounds in a language including such sounds as murmurs, and allophones. (Col. 8, lines 8-15)

Bordeaux and Shu not disclose the use of diacritics and graphemes in the phonetic alphabet.

Selounai teaches the use of diacritics and graphemes as part of the Arabic phonetic alphabet (page 408, right column, lines 50-55)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the language set disclosed by Bordeaux to include diacritics and graphemes

because this would allow Bordeaux's system to handle standard Arabic utterances for speech-to-text translation in order to improve linguistic capabilities of the system.

Allowable Subject Matter

13. Claim 6 is objected to as being dependent upon a rejected base claim 1, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not teach nor fairly suggest the combination of elements including further reduction of a text-to-speech phonetics set to obtain a set for ASR.

14. Claim 7 is objected to as being dependent upon a rejected base claim 1, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not teach nor fairly suggest the combination of elements including reduction of text-to-speech phonetics set using allophones and adding symbols representing the phoneme to be geminated.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Vitale et al. (6,347,298) teaches a method for reducing text-to-speech dictionary

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dmitry Brant whose telephone number is (703) 305-8954. The examiner can normally be reached on Mon. - Fri. (8:30am - 5pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Talivaldis Ivars Smits can be reached on (703) 306-3011. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

DB
12/12/03

TALIVALDIS IVARS SMITS
PRIMARY EXAMINER